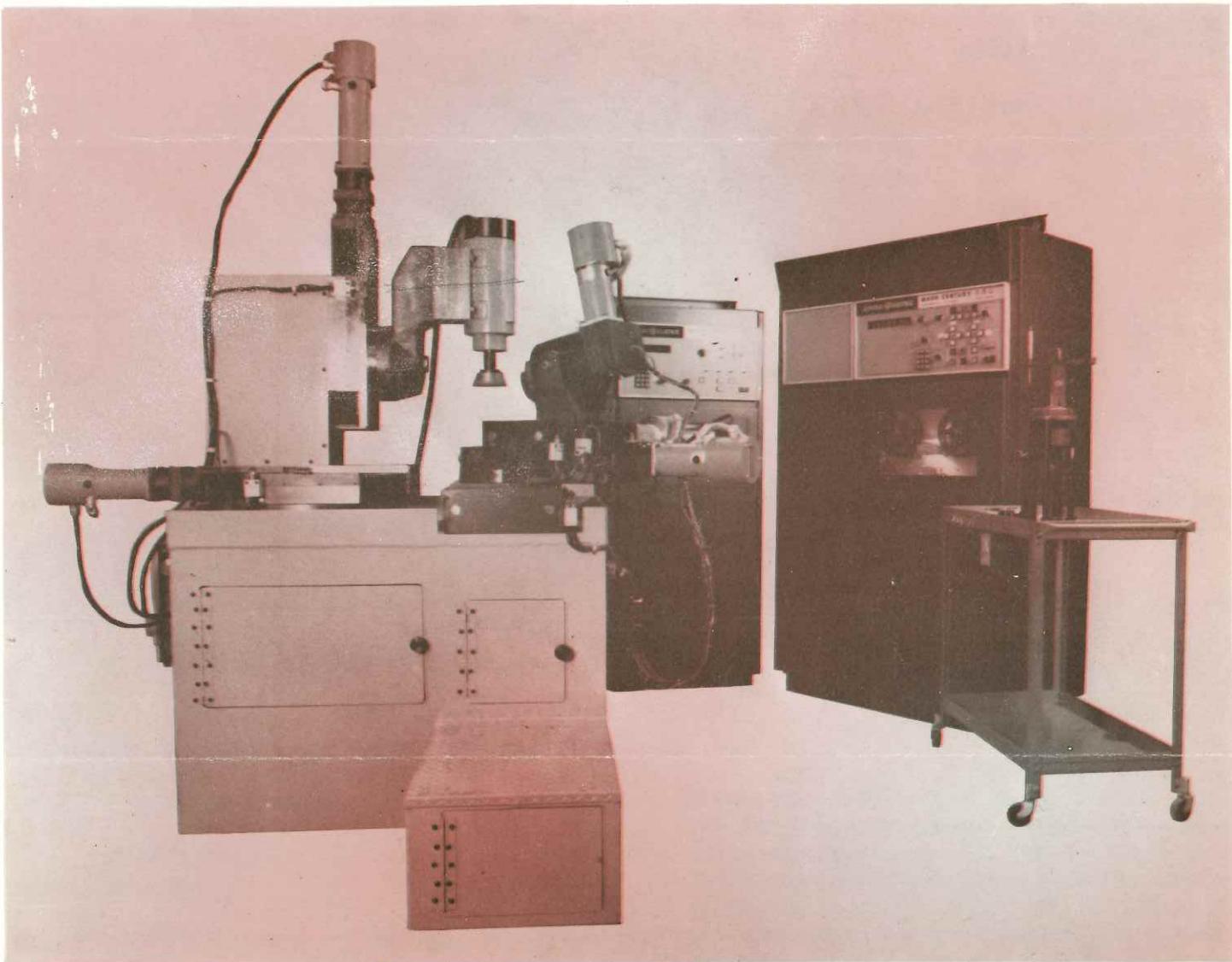
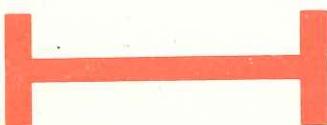


451-5

The
HUFFMAN
HS-1
A Numerically Controlled
Universal Grinder



51-165671



Advanced Tooling & Systems

Division of

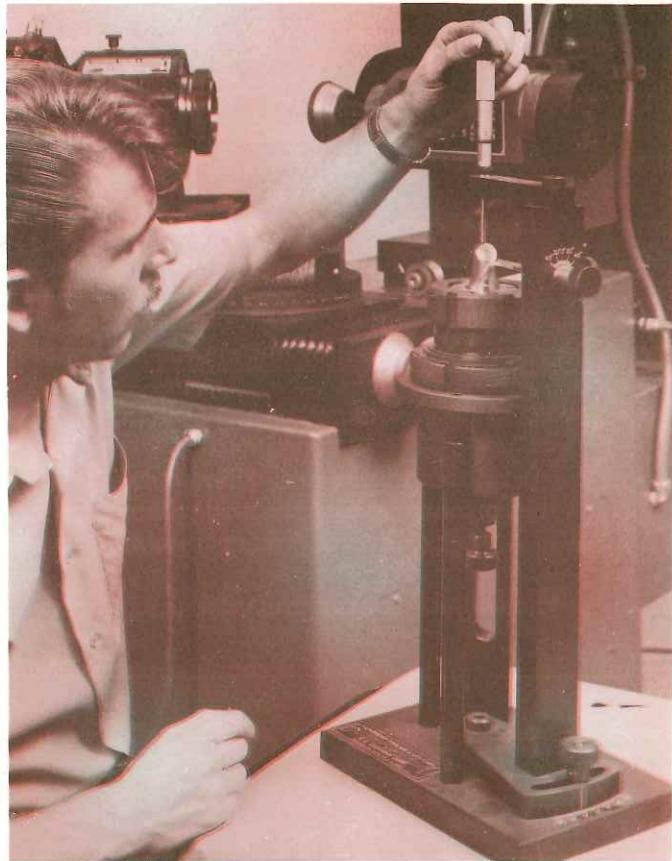
S. E. Huffman Corp.
P. O. Box 255
South Main St.
Clover, S. C. 29710

HS-1

- U** nique
- N** ew
- I**ncomparable
- V** ersatile
- E**xact
- R**eliable
- S**afe
- A**ccurate
- L**abor-saving

- G**ashes end mills
- R**elieves tools
- I**ncreases productivity
- N**ullifies hand operations
- D**ecreases down-time
- E**liminates scrap
- R**epeats tolerances

This is the only machine on the market today capable of automatically fluting, gashing and relieving end mills with positive rake angle at the axial cutting edge. It also generates all radii within its capacity, independent of tool diameter or gash. This machine will provide you with the capability of completely resharpening all your end mills, step and subland drills, and any other special cutting tools without operator skills. It will also provide you with the capability of manufacturing new tools.



Pre-Set Fixture

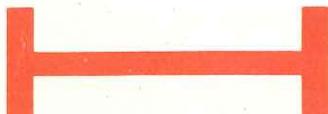
SUPERIOR FEATURES OF HS-1 FOR GASHING

RADIUS - AND - O. D. GRINDING OF:

—END MILLS	—BURRS
—STEP DRILLS	—ARBOR CUTTERS
—SUBLAND DRILLS	—GEAR HOBS
—SPECIAL CUTTING TOOLS	—CAMS
—RADIUS CUTTERS	—PUNCHES

Advanced Tooling & Systems

Division of
S. E. Huffman Corp.
P. O. Box 255
South Main St.
Clover, S. C. 29710



HS-1

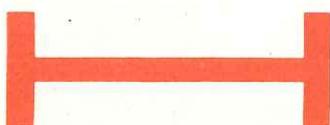
SUPERIOR FEATURES PROVEN ON THE HS-1 UNIVERSAL GRINDER

- (1) No operator technique other than setting tool in Pre-Set Fixture for length, helix, and proper radial location required.
- (2) Accuracy and repeatability unavailable before introduction of HS-1 because:
 - (a) Tape control of feeds, coolants and stock removal. All can be done with coolant as operator does not observe grinding.
 - (b) Controlled grinding wheel diameter by continuous gaging of diameter and feed back correction to NC Control.
 - (c) Resolution on X, Y axes of .0001" and highly accurate due to ball slides, ball screws and recirculating ball bushings.
- (3) Flexibility unlimited! The HS-1 can grind any shape or form which can be defined mathematically on the following cutters and work pieces:
 - (a) End mills - ball radius, square end center cutting
 - (b) Reamers - all types
 - (c) Arbor type cutters - shell mills - staggered tooth, etc.
 - (d) Burrs - all types including ball, oval, square and special
 - (e) Any form cutter within machining specks
 - (f) Gun drills
 - (g) Any special cutter within machine capacity limitations
 - (h) Boring bars
 - (i) Punches, cams, gear hobs, broatches, etc.
- (4) Time Saving - With all axis under tape control - three simultaneous - time is reduced to two minutes on most any cutters application.
- (5) Proven - Customer acceptance and our own use take away all doubt that the claims above are actual.
Come and See - Bring Your Cutters! Come to Clover, South Carolina!

The HS-1 is so versatile that we did not name it a numerically controlled Tool Grinder, but a Universal Grinder.

The HS-1 is equipped with General Electric's proven Mark Century 550 Series Control. Our standard model is available with seven axis under numerical control of which two are rotary axis, two "X", two "Y", and one "Z" axis. Thus, even with seven axis programming, it is not a difficult or complicated procedure. For those who have computer assist, Post Processor is available.

Integral driven wheel spindle with up to 5 HP motor with solid state variable frequency converter and forward and reverse switch will provide speeds from 72 to 7200 RPM. The wheel spindle has angular adjustment of 105° clockwise or counterclockwise from vertical. The spindle column also has an angular adjustment of +45° on a horizontal plane.



HS-1

SPECIFICATIONS FOR HS-1 NUMERICALLY CONTROLLED UNIVERSAL TOOL AND CUTTER GRINDER

	<u>With Workholder No. 2</u>	<u>With Workholder No. 3</u>
Max. end mill shank dia.	2-5/32"	2-1/2"
Min. end mill shank dia.	1/16"	1"
Max. grinding radius	4"	6"
Max. flute length	6"	6"
Max. overall length	12"	20"
Sub slide travel "X" (controlled with 550 MC)	6" Min. in .0001" inc.	6" Min. in .0001" Inc.
Worktable movement rotation (controlled with 550 MC)	+40° to -160°	+40° to -160°
Worktable travel "Y" (controlled with 550 MP)	+2 min. in .0005" inc.	+2 min. in .0005" inc.
Workable travel "X" (controlled with 550 MP)	5" min. in .0005" inc.	5" min. in .0005" inc.
Worktable size	6-1/2" X 8-1/2"	6-1/2" X 8-1/2"
Workholder angular adjustment	+20°	+20°
Square Collets	½, 3/8, 5/8, 3/4, 7/8, 1"	½, 3/8, 5/8, 3/4, 7/8, 1"
Rectangular Collets		1-1/2" X 2-1/2"
Workholder rotation (controlled with 550 MC)	97.222 RPM	97.222 RPM
Workholder index (controlled with 550 MC)	Min. in .01° inc. +1.5" 4.5" Total	Min. in .01° inc. +1.5" 4.5" Total
U bracket movement from center		
U bracket movement in "X" direction		
Wheelhead horizontal adjustment "Y" (controlled with 550 MC)	6" Min. in .0001" inc.	6" Min. in .0001" inc.
Wheelhead vertical adjustment "Z" (controlled with 550 MP)	6" Min. in .0005" inc.	6" Min. in .0005" inc.
Wheelhead angular range Clockwise from vertical	105°	105°
Counterclockwise from vertical Clockwise in horizontal plane	105° 45°	105° 45°
Counterclockwise in horizontal plane	45°	45°
*Wheel spindle RPM	72 to 7200 RPM	72 to 7200 RPM
*Wheel motor	1 HP up to 5 HP	1 HP up to 5 HP
*Electrical 220/440-3 phase-60 cycle- 110V Control		
*Wheel diameter for gashing	1-1/2" to 6"	1-1/2" to 6"
Wheel diameter for relieving	1-1/2" to 4"	1-1/2" to 4"
Floor space - machine only	81" X 54" X 84"	81" X 54" X 84"
Approximate weight skidded for shipment	4,000 pounds	4,000 pounds
Overall floor space including controls	8' X 9'	8' X 9'

*Variation from these specifications available by special quotation.

Advanced Tooling & Systems
 Division of
S. E. Huffman Corp.
 P. O. Box 255
 South Main St.
 Clover, S. C. 29710